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PHYTOCHEMICAL STUDIES ON CARDIOSPERMUM CANESCENS WALL.

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Abstract: *There is an awerness in the soceity about the use of herbal based medicine to cure ailments. So there is a demand for herbs lead to the pressure on the natural vegetation. It creates a problems on the ecosystems. A survey at Kanakapura taluk, Ramanagar district of Karnataka, an endangered plant Cardiospermum canescens WALL., is used to treate rheumatoid arthritis in addition to Cardiospermum halicacabum Linn., without knowing the difference between the two species. The phytochemical data reveals the presence of menthanamine and others, in addition to three similar phytochemicals.*

Keywords*: Survey, Endangered herb, Phytochemicals, Kanakapura, Arthritis.*

I. Introduction

India is one of the richest biodiversity country, having its own traditional systems of medicine like Ayurveda, Siddha, Unani and Homeopathy. In addition to that, the ethnic people at different geological areas are practicing their own system of medicine and got the knowledge from their forefathers to cure the common ailments. Nowadays all over the globe the people are very much interested to use the herbal medicines than the synthetic drugs due to their less side effects and low cost. But there is less scientific evidence about the curative properties of these natural drugs. So there is a need of scientific validation. Hence, made an attempt to know the phytochemical constituents and validate a rare herb *Cardiospermum canescens* Wall.

The herbaceous *Cardiospermum* belongs to Sapindaceae and represents more than 30 species globally. The two species [1] are known to occur in India. *Cardiospermum halicacabum* L., is cosmopolitan in distribution, whereas *Cardiospermum canescens* Wall., is restricted only in some pockets of Karnataka, Tamil Nadu and Andhra Pradesh. Gamble (1918) [2] reported the occurrence of *Cardiospermum canescens* Wall., from Deccan region. In fact, ours is the first report from Karnataka after Gamble. The local people of Kanakapura region are banking on *Cardiospermum canescens* Wall., in driving out of rheumatoid arthritis. The leaf paste is used to treat the disorder. The traditional and chemical knowledge is meagre, when compared to *Cardiospermum halicacabum* L. [3].

II. Materials and methods

Aerial portion of *Cardiospermum canescens* was collected from Tulasidoddi of Kanakapura and identified and authenticated with the voucher specimen at herbarium of Botany Department, Bangalore University, Bangalore. The collected biomass is dried under shade and powdered by using mortar and pestle. The coarse powder is stored in airtight container and used for physico-chemical studies. Preliminary phyto-chemical screening was undertaken following the standard procedures [4]. Further extracts are subjected to fluorescence analysis, inorganic elements are determined through Atomic Absorption Spectrophotometer (GBC932AA-Hallow Cathode Lamp). Their chemical constituents are determined using GC-MS instrument model GC Clarus 500, Perkin Elmer with NIST computer mass spectral library. The Capillary column was Elite-1 (5% phenyl, 95% dimethyl polysiloxane).

III. Results

Table - 1. Physico Chemical Constants

Sl. No	Parameters (%)	Value% w/w
01	*Loss on drying*	*19.2*
02	*Total Ash content*	*4*
03	*Acid insoluble Ash*	*0.04*

Table - 2. Extractive values

Sl.No	Reagents	Value%
01	*Ethanol*	*4.19*
02	*Water*	*3.94*

Table-3.Preliminary photochemical screening of water and alcohol extracts

Sl.No	Test	Water	Alcohol
01	*Saponin*	*Positive*	*Positive*
02	*Protein*	*Positive*	*Positive*
03	*Tannin*	*Positive*	*Positive*
04	*Sterol*	*Positive*	*Positive*
05	*Terpenes*	*Positive*	*Positive*
06	*Sugar*	*Positive*	*Positive*
07	*Flavonoids*	*Positive*	*Positive*
08	*Lignin*	*Negative*	*Negative*
09	*Alkaloids*	*Positive*	*Positive*
10	*Starch*	*Negative*	*Negative*
11	*Gum*	*Negative*	*Negative*

Table-4. Fluorescencece Analysis of Extract

Sl.No	Extracts	Day light	UV Light
01	*Water*	*Light brown*	*Light green*
02	*Ethanol*	*Dark green*	*Dark green*
03	*Acetone*	*Dark green*	*Dark green*
04	*Ethyl acetate*	*Dark green*	*Dark green*
05	*Chloroform*	*Light brown*	*Light brown*

06	*Benzene*	*Brown*	*Green*
07	*Hexane*	*Green*	*Green*
08	*Petroleum ether*	*Light green*	*Red*

Table-5.AAS Analysis for different elements

Macro Nutrients			**Micro Nutrients (in ppm)**				**Heavy Metals (in ppm)**		
Nitrogen %	*Phosphorous%*	*Potash%*	*Iron*	*Manganese*	*Zinc*	*Copper*	*Chromium*	*Lead*	*Cadmium*
3.43	*0.26*	*1.36*	*371.65*	*63.85*	*45.05*	*97.0*	*0*	*2.5*	*0*

Fig-1.Chromatogram

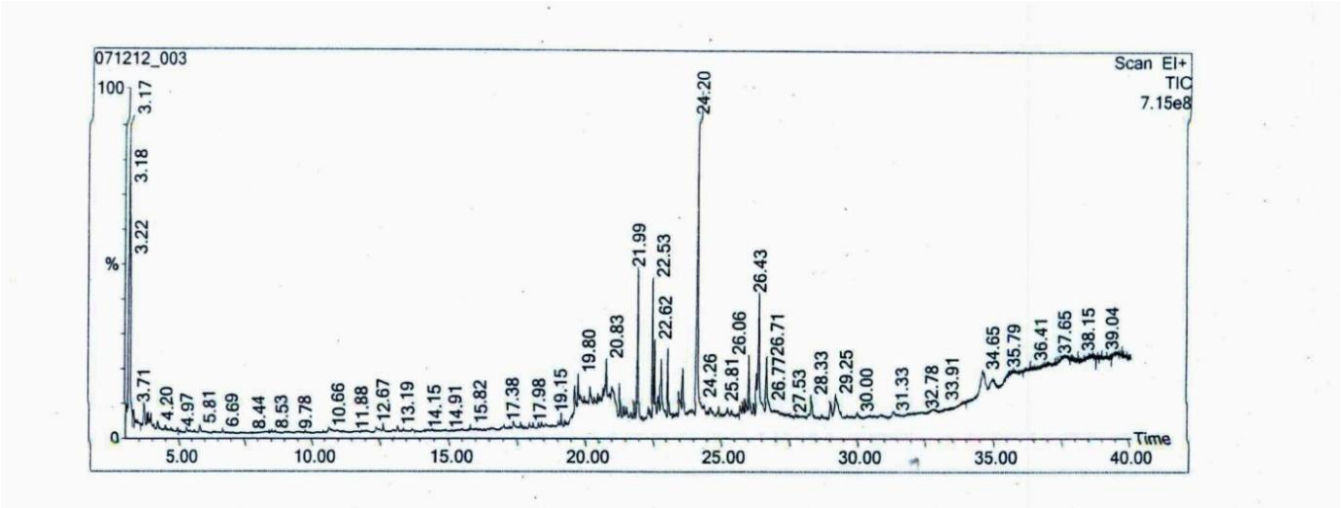

Table-6.Chemical constituents of selected drugs detected through GCMS analysis

Sl.No	**Retention time**	**Scan**	**Area%**
01	*3.17*	*Methanamine*	*8.67*
02	*3.71*	*Dextroamphetamine*	*0.94*
03	*3.96*	*Acetic acid, hydroxy-,methyl ester*	*0.45*
04	*19.67*	*Acetic acid,10,11-dihydroxy-3,7,11-trimethyl dodeca-2,6-dienyl ester*	*1.19*
05	*19.80*	*2-Octen-1-ol,3,7-dimethyl-, isobutyrate, (z)*	*1.42*
06	*19.88*	*Butanoic acid; 4-butoxy*	*1.53*
07	*20.03*	*7-Methyl-z-tetradecen-1-ol acetate*	*0.65*
08	*20.10*	*1-Heptatriacotanol*	*0.93*
09	*20.24*	*3-(1-Methylhept-1-enyl)-5-methyl-2,5-dihydrofuran-2-one*	*1.90*
10	*20.39*	*1-Benzoxirel-3-ol,2,2,5a-trimethyl-la-[2-(2-methyl)-1,3-dioxolan-2-yl-l-ethenyl] Perhydro*	*1.04*

11	*20.53*	*1,6,6-Trimethyl-7-(3-oxobut-1-enyl)-3,8-dioxatricyclo[5.1.0.0(2,4)]octan-5-one*	*0.75*
12	*20.60*	*2-Myristynoyl pantetheine*	*0.87*
13	*20.72*	*5,6,6-Ttrimethyl -5-(3-oxobut-l-enyl)-1-oxaspiro[2,5]octan-4-one*	*0.93*
14	*20.82*	*Hexadecanal*	*2.18*
15	*20.95*	*Pentadecanoic acid,14-methyl-,methyl ester*	*1.10*
16	*21.04*	*1-Dodecanol, 3,7,11-trimethyl-*	*1.87*
17	*21.32*	*4-(2,4-Dimethylcyclohex-3-enyl)but-3-en-2-one*	*0.53*
18	*21.98*	*5,5,8a-Trimethyl-3,5,6,7,8,8a-hexahydro-2H-chromene*	*2.66*
19	*22.53*	*3,7,11,15-Tetramethyl-2-hexadecen-1-o1*	*1.31*
20	*22.61*	*2-Pentadecanone,6,10,14-trimethyl-*	*7.77*
21	*22.85*	*3,7,11,15-Tetramethyl-2-hexadecen-1-o1*	*1.47*
22	*23.1 0*	*3,7,11,15-Tetramethyl-2-hexadecen-1-o1*	*1.14*
23	*23.50*	*6-(3-Hydroxy-but-1-enyl)-1,5,5-trimethyl-7-oxabicyclo[4.1.0]heptan-2-ol*	*0.70*
24	*23.65*	*Hexadecanoic acid, Methyl ester*	*1.31*
25	*24.19*	*n-Hexadecanoic acid*	*7.77*
26	*26.06*	*Phytol*	*0.98*
27	*26.34*	*9,12-Octadecadienoic acid(z,z)*	*0.83*
28	*26.43*	*Oleic acid*	*3.20*
29	*26.70*	*Octadecanoic acid*	*1.47*
30	*28.34*	*1-Oxaspiro[2,5]octane, 5,5-dimethyl-4-(3-methyl-1,3-butadienyl)-*	*0.65*
31	*29.03*	*4,8,12,16-tetramethylheptadecan-4-olide*	*0.44*
32	*29.25*	*1,2-Benzenedicarboxylic acid,diisooctyl ester*	*1.25*
33	*34.66*	*Cholesta-4,6-dien-3-ol,(3β)-*	*1.66*
34	*37.65*	*Astaxanthin*	*0.41*
35	*37.73*	*L-Asparagine,Nτ-[2-(acetylamino)-4-O-[2-(acetylamino)-2-deoxy-3,4,6-tri-O-(trimethylsilyl)-β-D-glucopyranosyl]-2-deoxy-3,6-bis-O-(trimethylsilyl)-β-D-glucopyranosyl]*	*0.46*

IV. Discussion and Conclusion

Cardiospermum canescens Wall., an herbal drug used by local people of Kanakapura region as a traditional medicine was studied for its phytochemical constituents. The chemical standard reveals loss on drying 19.2%, total ash 4 %, acid soluble ash 0.04%. Extractive values for Ethanol l4.19 % and for Water 3.94%. Preliminary phytochemical studies revealed the presence of Saponin, tannin, Sterol, Terpenes, Flavonoids, Saponins, and Alkaloids. GC-MS analysis revealed presence of 33 compounds, out of that Methanamine, n-Hexadeconoic acid, Oleic acid, 5, 5, 8a- trimethyl-3,5,6,8,8a-hexahydro-2H-Chromene and Hexadecanal shows 8.8%, 7.8%, 3.2%, 2.7% and 2.2% area respectively.

Atomic absorption spectroscopy revealed the presence of various elements such as Nitrogen, Phosphorous, Potash, Iron, Manganese, Zinc, Copper and Lead.

The chemical constituents determined in the present work add to the pharmacopeia of the traditional drug sources. Our studies can help to the modern society to use this drug in addition to another species *Cardiospermum halicacabum.* Since, it is a rare in Karnataka. A chemical standard helps in checking the adulterants and substitutes of this drug. This directly helps to checking the quality of herbal drug for the betterment of modern society. The phytochemical studies of *Cardiospermum canescens* revealed the presence of Phytol, Hexadecanoic acid and 3,7,11,15-Tetramethyl-2-hexadecen-1-o1as exclusive compound in contrast to *Cardiospermum halicacabum* [5] and therefore this plant, if multiplied through tissue culture studies may serve as a substitute to *Cardiospermum halicacabum*.

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